

## The technical efficiency of oral healthcare provision

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**The technical efficiency of oral healthcare provision: evaluating role substitution in  
NHS dental practices in England**

**Running head: Evaluating role substitution in dental practices in England**

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Abstract –

Objectives: In many countries increasing use is being made of Dental Care Professionals (DCPs) to provide aspects of clinical activity previously undertaken by dentists. This study evaluates the differences in practice efficiency associated with the utilisation of DCPs in the provision of General Dental Services in the National Health Service (NHS) in England.

Methods: 121 NHS practices completed a questionnaire and shared practice information held at the NHS Business Services Authority. Practice efficiency was estimated using Data Envelopment Analysis with the robustness of the findings checked using Stochastic Frontier Model estimation.

Results: Dental practices operated at an estimated mean level of technical efficiency of 64%. Variations among practices in the use of DCPs were not associated with variations in practice efficiency after controlling for other staffing levels, patient population characteristics and practice variables.

Conclusions: The current NHS dental contract limits the potential for efficiency improvements by setting annual practice activity targets that produce little incentive for role-substitution. While DCPs may be practising efficiently this is not reflected in practice level efficiency, possibly because of dentists using the time released for other non NHS activity.

## INTRODUCTION

Maximising health gain from available resources is an ethical imperative for health service managers internationally<sup>1</sup>. The United Kingdom (UK) Independent Review of National Health Service (NHS) dentistry in 2009 concluded that there was an overwhelming need to make best use of the whole dental workforce<sup>2</sup>. Across England, approximately 55% of patients who attend for a regular dental check-up do not require any treatment<sup>3</sup>. This costs the NHS over £1 Billion per annum and represents about a quarter of the total annual NHS expenditure on dental care<sup>3</sup>. In contrast, half of the population does not attend a dentist on a regular basis and this group tends to be from the most disadvantaged communities and experience the majority of oral disease<sup>4</sup>. As a result, patients with the least need are being seen by the most expensive resource, the General Dental Practitioner (GDP), whilst patients with high levels of need appear to have problems accessing NHS dental services<sup>5</sup>.

In the UK NHS, there are two categories of GDP: Principals and Associates. Principals own the dental practice and are responsible for paying estate, staff and consumable costs associated with the delivery of services under their NHS dental contract. Since 2006, Principals in England and Wales have been paid according to "Units of Dental Activity" (UDAs) - a measure of the amount of dental activity provided in a course of treatment. Courses are allocated into one of three treatment bands. Recall appointments ("check-ups") attract one UDA, treatment that involves fillings, root fillings or extractions earn the GDP three UDAs while laboratory work (e.g., dentures or crowns) generates 12 UDAs. The amount of UDAs an NHS dental practice may claim in a year is specified in the Annual Contract Value (ACV), which is set by the local NHS Area Team in England, in discussion with individual dental practices. Practice Principals contract directly with NHS commissioners in the NHS Area Team. In contrast, Associates sub-contract with a Practice Principal, are self-employed, and rent premises, facilities and support staff time from the practice. Principals and Associates in England and Wales do not receive additional remuneration for any NHS care delivered over 102% of their respective ACVs and are penalized through a pro-rata claw-back of remuneration if activity falls below 96% of their ACV. As such, NHS dental practices in England are "output-constrained" in the number of UDAs they are contracted to deliver in a given year.

Dental Care Professionals (DCPs) are non-dentist members of dental teams. They include Dental Nurses, Dental Hygienists, Dental Hygiene-Therapists and Dental Therapists. Based on each profession's scope of practice, some DCPs perform a supplementary role (e.g. Dental Nurses) whilst others can perform tasks otherwise undertaken by the GDP, known as role substitution (e.g. Dental Hygienists, Dental Hygiene-Therapists and Dental Therapists)<sup>6</sup>. The rest of this paper refers to DCPs as those dental team members performing activities that otherwise would be performed by a dentist and hence represent role substitution in NHS dental practice. Role substitution has the potential to enable Principals to replace higher paid dentist time with lower paid DCP time in some aspects of NHS service delivery, potentially reducing the costs of providing the contracted level of activity (ACV)<sup>7</sup> and releasing dentist time for more advanced treatments.

Role substitution could increase or decrease practice efficiency according to how the dental practice uses the dentist's time released. Studies of role substitution in medicine found that efficiency was improved only when (a) physician time was released from the tasks delegated to nurses (i.e. nurse time replaces rather than supplements physician time) and (b) released physician time is used for tasks which only physicians can perform<sup>8</sup>. In NHS dentistry, the limited evidence on the economic consequences of role-substitution<sup>2,9,10,11</sup> suggests that it has the potential to reduce labour costs. In other countries, role substitution in dentistry has been found to increase efficiency and effectiveness in service provision<sup>12</sup>, with the potential to release resources and increase the capacity to care<sup>13,14,15</sup>.

This study aimed to examine whether practice-level efficiency is associated with the presence, level and nature of role substitution within NHS dental practices in England. In particular, we considered the prevalence and nature of DCP use among practices, the relative contribution of DCPs to service delivery and whether use of DCPs is associated with service mixes in which prevention is emphasized. The analysis aims to address the following research questions: (1) Are NHS dental practices that employ DCPs more efficient than practices that do not employ DCPs; and (2) Among NHS practices that employ DCPs; (a) Is the level of efficiency associated with the level of DCP use; (b) Is the level of efficiency

associated with the proportion of clinical time provided by DCPs; (c) Is the proportion of claims for routine services associated with the level of DCP use?

## METHODS

All NHS dental practices in the Greater Manchester (n=477), North-East England (n=143) and South Yorkshire (n=201) regions of England were invited to participate in the study. These three regions were chosen for their similarity to the England average in NHS earnings per dentist<sup>16</sup>, the prevalence of dental caries<sup>17</sup> and the national average number of UDAs and courses of treatment per NHS dentist (Appendix, Table A1).

Practices within these regions were excluded from the study if the practice was a single dental chair surgery, a member of a dental corporate body (a listed company providing dental care from multiple sites) or provided NHS care for children only. This is because role substitution is unlikely in single-surgery dental practices, whilst practices belonging to corporate bodies operate under a different incentive structure from most NHS dental practices. NHS practices with children-only contracts do not offer the full range of clinical tasks that can be provided by DCPs and hence present more restricted opportunities for role-substitution.

The number of practices that were contacted and either declined before eligibility could be assessed or were not eligible was 448 (55% of NHS practices in the regions). Of the eligible practices, 121 (27%) agreed to participate.

Each participating practice was asked to complete a short questionnaire about the type and quantity of resources used in delivering NHS dental care. The domains used in the questionnaire were based on a review of the existing literature on dental care production and discussions with NHS dentists from the Greater Manchester Local Professional Network. The

key resources were the number of NHS hours worked by the different types of staff in the dental team and the number of dental chairs available for patient treatment.

Each practice principal was asked to provide consent for the research team to link the information in the questionnaire to data held at the NHS Business Services Authority (BSA) on the NHS services delivered by the practice. Data were provided for the fiscal year ending March 31<sup>st</sup> 2014. All orthodontic activity was excluded because orthodontic treatment is remunerated separately and not part of the UDA target<sup>18</sup>. Table 1 presents information on data sources and the designation of variables as an input into the production of dental healthcare or an output (dental healthcare delivered). In the Appendix, Table A2 presents the practice characteristics measures, and Table A3 presents the patient population and service mix measures.

The input data from the questionnaire were used to estimate a production frontier for each measure of dental healthcare output (Table 1). The estimated production frontier indicates the estimated maximum output an NHS dental practice is able to produce, given the levels and mix of resources used. It is through a comparison with the production frontier that the level of efficiency of an individual practice is inferred. Efficiency scores were estimated using Data Envelopment Analysis (DEA), a common approach employed in studies evaluating efficiency in the healthcare sector<sup>1</sup>. Further details of the DEA estimation method are found in the online appendix.

In addition to the DEA estimates, an alternative approach to efficiency estimation was used to see whether the findings were sensitive to the method used. Stochastic Frontier Models (SFM) decompose efficiency scores to reflect a combination of relative efficiency, measurement error in the dependent variable and statistical noise<sup>19</sup>. If the DEA and SFM approaches yield a large difference in the rank ordering of the efficiency score estimates, this indicates that one or both of model designs should be reconsidered. A description of the SFM's functional form, distribution function of inefficiency scores, method of estimation and model fitness is found in the online Appendix.

After the first stage estimation of calculating efficiency scores by practice using DEA, multivariate regression methods were used to explore the relationship of practice efficiency scores to practice-level factors. If we choose the dependent variable  $y_i$  to represent the efficiency score of practice  $i$ , the second stage model can be written as,

$$y_i = \beta X_i + \varepsilon_i \quad i=1,2,\dots,N$$

where  $\varepsilon$  is unobserved random error and  $X$  is a set of practice characteristics that includes a measure of the extent of use of mid-level providers at a practice. Details of the methods used to ensure a feasible and consistent inference in this ‘second stage analysis’ are outlined in the online Appendix.

The annual number of UDAs is the measure of healthcare output for calculating the efficiency scores used in the second-stage analysis. This is a more sensitive measure of the quantity and value (from a provider perspective) of healthcare delivered than the number of treatment plans delivered or patients seen. The extent of role substitution in NHS dental practices was measured in terms of whether a practice employed DCPs to provide care for NHS patients; the number of sessions devoted to NHS patients by DCPs in a typical week and the number DCP sessions devoted to NHS patients expressed as a proportion of the number of dentist sessions devoted to NHS patients. The practice characteristics that served as control variables in the model were the number of sessions per week worked by practice dentists on NHS patients, the number of support staff sessions per week (managerial and administration staff), the number of dentist chairs in each practice, the number of adult (non-elderly) patients (ages 18-59) as a percentage of all patients served, and the percentage of all patients that are exempt from NHS payment charges (i.e. expectant or nursing mothers, or those in receipt of Income Support, Job Seekers Allowance, Working Family Tax Credits, or holding certificates for full or partial help with healthcare costs).

## RESULTS

Completed practice questionnaires were received from 121 practices (27%). Table 2 compares the sample of 121 practices to the entire population of dental practices with NHS



contracts in England to examine the generalisability of the study sample. Compared to all NHS practices in England the sample practices had higher annual outputs of UDAs (15,444 and 10,494 respectively,  $p<0.01$ ), higher annual mean number of patients seen (5,597 and 3,670,  $p<0.01$ ) and more treatment plans provided per year (7,286 and 4,701,  $p<0.01$ ). Despite this difference in scale, the distribution of claims across dental bands of activity and the percentage of UDAs claimed from treating patients exempt from NHS charges were not statically different between the sample practices and all NHS practices in England. However, the mean percentage of treatment activity for adult patients was greater in the sample practices (74%) than in England (65%).

The distribution of practice efficiency for the outcome measures (UDAs, numbers of treatment plans and patients seen) is reported in Table 3. NHS dental practices in England were operating at an estimated mean level of efficiency of 64%.

Using a SFM model to estimate efficiency (Table A4 in the Appendix) resulted in significantly lower mean practice efficiency scores than those estimated using DEA. This was expected, some measurement errors/statistical noise is excluded from SFM estimates of efficiency scores. The Spearman's rank order correlation coefficient between SFM and DEA efficiency scores was 0.72, indicating efficiency rankings of practices were similar under the alternative approaches. This finding suggests that, if measurement error is present in the DEA efficiency scores, it is small, a finding which validates DEA as an appropriate choice of frontier estimation in this research setting.

*Are NHS dental practices that employ DCPs significantly more technically efficient than practices that do not employ DCPs?*

The association between efficiency scores and the use of DCPs in a practice is presented in Model 1 in Table 4. Practices that use DCPs to serve NHS patients were found to have (on average) lower efficiency than practices with no DCPs, after controlling for other practice and patient characteristics. The mean efficiency difference was 14% ( $p<0.001$ ). This finding

was robust to the use of different output measures in the production function (treatment plans and patients seen), where the efficiency difference remained large (11%) and statistically significant.

*Is the level of technical efficiency significantly associated with the level of DCP use among NHS dental practices that employ DCPs?*

Among practices employing DCPs, no association was observed between efficiency scores and level of role substitution (number of DCP weekly sessions worked with NHS patients) after controlling for patient and practice characteristics (Model 2 in Table 4). This finding was robust to the use of treatment plans and patients seen as output measures. In both Models 1 and 2, the number of administration support staff sessions was associated with lower efficiency, although the size of this association was small (0.5% and 4.2% lower efficiency respectively).

*Is the level of efficiency significantly associated with the proportion of clinical time provided by DCPs among those NHS dental practices that employ DCPs?*

No association was observed between practice efficiency and the time provided by DCPs as a proportion of dentist time for any of the output measures (Model 3 in Table 4). In other words, no evidence was found that role substitution (DCPs contributing a higher proportion of total provider time in a practice) contributes to practice efficiency.

*Is the proportion of claims for routine services significantly associated with the level of DCP use among NHS dental practices that employ DCPs?*

In terms of the service mix of practices, the number of DCP sessions per se did not explain differences between practices in service mix (proportion out of all treatments delivered that

are NHS payment Band 1, Band 2 and Band 3) after controlling for staffing levels, patient population and practice environment variables. However, when expressed as a proportion of dentist time, DCP time was shown to be associated with variations in the proportion of practice output made up by preventive care. A 1% higher input in DCP weekly sessions relative to dentist weekly sessions was associated with a 3.6% percentage higher proportion of the service mix made up of preventive treatments. Hence, role substitution does appear to support a more preventive service mix among practices.

## DISCUSSION

We found no evidence that incidence of DCP use in NHS service provision contributed to practice efficiency, the level of use of DCPs or the relative contribution of DCP time in an NHS dental practice. However, our findings suggest that where DCPs have been substituted for dentist time in practices (as opposed to supplementing dentist time), preventive treatments constitute a larger proportion of practice service output. The absence of an association between DCP hours and productivity is consistent with findings from studies in the UK<sup>20</sup>, Finland<sup>21</sup> and Norway<sup>22</sup>. However, our data are UK-specific and so the findings may not be generalizable, particularly since the UDA system is unique to England and Wales and the role of DCPs varies internationally<sup>23</sup>.

We found an absence of DCP use in 53 practices (44% of the sample). This may be explained by a “free-rider” problem, whereby any dentist in the practice may refer work to the DCP, although a smaller number of dentists pay the DCP salary. For example, practice principals may be reluctant to hire a DCP if salaried Associate dentists could utilize the DCP to reduce their overall workload (and so not using freed up time to work on other important tasks).

There are both strengths and limitations to this study. The large practice sample (n=121) in this study reduces the likelihood of overestimates of efficiency and improves identification of typical associations between inputs and outputs and between role substitution and efficiency scores. However, the cross-sectional nature of the data meant that the analysis could not

determine the precise mechanisms underlying the findings or infer causality and the self-report nature of the questionnaire data may have introduced measurement error into the efficiency estimate. A weakness of the available data is that healthcare outcomes are likely to be nested in a multilevel structure (practice, dentist, patient) and, because data were available only at the practice level, it was not possible to take this multilevel structure into account in the analyses. Another limitation of this study is the possibility of two forms of selection bias. There might be systematic bias in which type of dentist and DCP decided to participate in the study, and in those who did participate, employment of DCPs is not random. We found some evidence of bias in our study. The overall response rate was 27%, which could have introduced bias if non-response was unequal among eligible practices in the use of role substitution and/or practice healthcare outcomes. Follow-up contact with non-responding practices found the main reason for non-response was the reluctance to provide sensitive financial and/or contractual information that could be used to assess the profitability of the practice, despite the study having clearly stated procedures for ensuring the confidentiality of all collected information.

Caution should also be exercised in the interpretation of the finding of lower efficiency scores among NHS practices that use DCPs, because it could be a consequence of the limited scope of the “efficiency” measure we used. Because DCPs do not contract directly with the NHS, the BSA data have no individual measure of DCP activity or outputs. As a result, we were constrained to analyse efficiency at the level of the NHS dental practice, not DCPs per se. It could be that DCPs are being used efficiently and in accordance with their full scope of practice, but their use is associated with a reduction in efficiency of the Practice Principals or Associates in NHS service delivery. For example, because of the output targets in the NHS contract, efficiency gains in the NHS may be lost to the private sector should dentist time released through DCP use be devoted to increasing private sector provision.

Another limitation is that a practice that is achieving high levels of efficiency in activity may not be as high on measures of the effect that dental healthcare has on patients’ oral health or other relevant factors of overall performance in NHS dentistry, such as service coverage and access to care, responsiveness to changes in population needs and satisfaction with services. If practices are motivated by a professional desire to provide a good service, rather than a

1 financial reason related to role substitution (e.g. the time saved to the dentists is used in  
2 another way to accrue greater remuneration), lower “efficiency” could even be a reflection of  
3 higher quality care that produces better patient outcomes and/or satisfaction by (for example),  
4 dentists taking more time with patients. This may explain the finding of association of lower  
5 “efficiency” scores for practices that use role-substitution. If a better patient outcome is  
6 thought by some dentists to be produced by preventive dental healthcare, then some practices  
7 may focus on prevention. As such, these practices will be less likely to accrue UDAs from  
8 higher UDA generating operational interventions and be more likely than other practices to  
9 use skill mix due to the inability of DCPs to perform operational interventions (such as DCPs  
10 are unable to prescribe fluoride, local analgesia and radiography or to provide a treatment  
11 plan under the NHS dental contract regulations). In addition, efficiency here is measured in  
12 terms of the quantity of resources used to produce a given quantity of a restricted range of  
13 services (that is, excluding orthodontics which is not covered by UDAs). DCP use may  
14 enhance practice efficiency in this specialist area of dentistry but this would not be captured  
15 in our UDA-based efficiency measure.

16  
17 So what else might explain the failure of DCP use to result in lower costs of producing  
18 contracted levels of activity? Before the introduction of the 2006 contract, there was a clear  
19 incentive to treat and no incentive to prevent, because dentists were paid to treat, to fill,  
20 crown, scale, extract and replace. With the introduction of UDAs in 2006, the incentives  
21 became more complex but practices were still remunerated for treatment. These contracts do  
22 not explicitly reward role substitution and will only indirectly reward the dentist if the time  
23 saved from role substitution is used in another way that is preferred by the dentist (e.g. seeing  
24 more patients or time away from work). In addition to the absence of a financial incentive  
25 that may encourage the use of role-substitution, the 2006 contract appears to have introduced  
26 a disincentive for Associate dentists to refer work to DCPs. Under current NHS regulations,  
27 DCPs are not allowed to undertake the examination themselves, despite recent changes to  
28 their scope of practice introduced by the Dental Regulator in 2013<sup>2</sup>. As such, they rely on  
29 referrals from Practice Principals and Associates. However, work referred to DCPs is a loss  
30 of potential earnings for Associates. DCPs’ NHS activity is counted as Practice Principal  
31 activity and so in many practices they are in open competition with Associates for the number  
32 of UDAs that they can earn. For example, if an Associate dentist refers a patient for a tooth  
33 restoration to a DCP, the UDAs generated from this activity are mainly attributed to the

Practice Principal (who pays for the DCP), not the Associate dentist. In this situation, the Associate dentist earns only one UDA (for the initial examination) out of a total of three UDAs (for an examination and a restoration). It follows that the inability of DCPs to undertake a NHS examination or to contract with NHS commissioners directly disincentivises the use of role substitution within NHS dental practices, such that they are not being used to their full practice scope. Another possible explanation is the influence of the fixed ACV on practice output within the 2006 NHS dental contract in England. If there are practice efficiency improvements brought about by role substitution, it may depend on flexibility in inputs in the short term, and contracted employment arrangements may limit the capacity to adjust staff mix in the short-term. For example, if the NHS dental team achieve their ACV before the end of the financial year, there is no incentive to undertake any further NHS activity, given the penalties applied above 102% of the ACV.

The need for better alignment between the financial incentives within the NHS dental contract and the use of DCPs is key if the NHS is to address the recommendations of the Independent Review<sup>6</sup> and make best use of the whole dental workforce. The development of a direct DCP NHS contract would offer more flexibility for commissioners than a new contract with dentists or dental practices of remuneration by capitation payment, which is an approach that would, in theory, align financial incentives to role-substitution. Capitation remuneration payment in dentistry is not related to the quantity of treatment delivered and is usually for the number of registered patients. Role substitution under this type of contract is more likely because DCPs are trained to provide preventive activity and the health provided from preventive activity requires less input than the operative alternative.

Under the current fiscal climate of constrained programme expenditures in many healthcare systems, it is important to consider sectors of healthcare where productivity improvements could be made without major capital spending. This study considered service re-organisation in dentistry in England. The potential for NHS dental practices to meet their NHS remuneration target using role substitution does not appear to be a feasible strategy for producing more General Dental Services from available NHS budgeted expenditures under current NHS contractual arrangements. The inability of DCPs to examine NHS patients under

NHS regulations (despite being able to from a regulatory perspective), to contract with NHS commissioners directly and the ceiling threshold of the ACV, appear to be key constraints.

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1 **Tables to appear in the main text**

2 Table 1: Input and output variables for healthcare production

<b>Variable name</b>	<b>Measure of healthcare input or output</b>	<b>Variable description</b>	<b>Data source</b>
<b>UDAs</b>	Output	Units of Dental Activity (UDAs)	BSA
<b>Patients seen</b>	Output	Number of adult and children seen	BSA
<b>Treatment Plans</b>	Output	The number of dental activity forms (individual claims made)	BSA
<b>Weekly DCP sessions with NHS patients</b>	Input	The number of sessions (half days) worked by Dental Hygienists, Hygiene-Therapists, Dental Therapists seeing NHS patients in a typical week	Questionnaire
<b>Weekly dentist sessions with NHS patients</b>	Input	The number of sessions (half days) worked by dentists (Practice Principals and Associates) seeing NHS patients in a typical week	Questionnaire
<b>Weekly nurse sessions</b>	Input	Number of sessions (half days) worked by dental nurses in a typical week	Questionnaire
<b>Weekly administration staff sessions</b>	Input	The number of sessions (half days) worked by practice managers and administrative staff in a typical week	Questionnaire
<b>Number of surgeries</b>	Input	The number of surgeries that are typically in operation (for at least 3 days per week)	Questionnaire

1 Table 2: Sample practices compared to national data

Practice characteristics	Sample mean (n=121)	England mean (n=8,788)	P value of difference in means
Annual number of UDAs	15,444	10,494	<0.01
Annual number of treatment plans (claim forms)	7,286	4,701	<0.01
Annual number of patients seen	5,597	3,670	<0.01
Percentage of UDAs from adults	73.6	65	0.02
Percentage of UDAs from 40 year old and over patients	52.7	41	0.03
Percentage of UDAs from patients exempt from patient charges	37.3	41	0.73
Percentage of claims that are Band 1	57.3	54	0.69
Percentage of claims that are Band 2	28.4	30	0.86
Percentage of claims that are Band 3	4.7	6	0.32
Percentage of claims that are Urgent	9.6	9	0.75
Active dentists at the practice	5.7	3.9	0.04

2 Practice population England data obtained from the BSA for the year 2013/2014. Dentists  
3 considered "active" at a practice if there has been processed NHS claim in the analysed  
4 period.

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1 Table 3: Distribution of NHS general practice efficiency scores on UDAs, Treatment plans  
2 and patents seen.

Efficiency scores	Annual number of UDAs (mean score = 0.64)	Annual number of treatment plans (claims) (mean score=0.63)	Annual number of patients seen (mean score = 0.62)
1	20	24	18
0.9-0.99	27	29	31
0.8-0.89	23	21	24
0.7-0.79	26	28	25
0.6-0.69	17	14	17
0.5-0.59	5	4	6
0.4-0.49	2	1	0
Less than 0.4	1	0	0
All	121	121	121

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1 Table 4: Association with efficiency scores and the level of role substitution

Variable	Output measure					
	Model 1		Model 2		Model 3	
	Parameter estimate	p-value	Parameter estimate	p-value	Parameter estimate	p-value
Any use of DCPs with NHS patients	- 0.14	<0.01	-	-	-	-
Weekly DCP sessions with NHS patients	-	-	- 0.004	0.51	-	-
The proportion of DCP to dentist sessions seeing NHS patients	-	-	-	-	0.05	0.09
Weekly dentist sessions with NHS patients*	- 0.001	0.76	0.001	0.73	-	-
Weekly support staff sessions	- 0.005	<0.01	- 0.005	<0.01	- 0.04	<0.01
Number of dentist chairs for patient treatment	- 0.04	0.02	- 0.04	0.05	- 0.17	0.10
Percentage of adult non-elderly patients	- 0.19	0.09	- 0.21	0.11	- 0.14	0.35
Percentage of adults with non-age related exemption	- 0.13	0.34	- 0.09	0.57	0.05	0.09

\*Weekly number of sessions per week worked by dentists on NHS patients is not present in model 3 to avoid correlation between that term and the proportion of DCP sessions to dentist sessions variable.

## **Declarations**

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## **Disclaimer**

The views and opinions expressed therein are those of the authors and do not necessarily reflect those of the Health Services and Delivery Research programme, National Institute for Health Research, the Health Services, NHS or the Department of Health.



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